World Academy of Science, Engineering and Technology
International Journal of Geological and Environmental Engineering
Vol:19, No:05, 2025

# Evaluation Of Reservoir Quality In Cretaceous Sandstone Complex, Western Flank Of Anambra Basin, Southern Nigeria

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**Abstract :** This study demonstrates the value of outcrops as analogues for evaluating reservoir quality of sandbody in a typical high-sinuosity fluvial system. The study utilized data acquired from selected outcrops in the Campanian-Maastrichtian siliciclastic succession of the western flank of Anambra Basin, southern Nigeria. Textural properties derived from outcrop samples were correlated and compared with porosity and permeability using established standard charts. Porosity was estimated from thin sections of selected samples to reduce uncertainty in the estimates. Following facies classification, 14 distinct facies were grouped into three facies associations (FA1-FA3) and were subsequently modeled as discrete properties in a block-centered Cartesian grid on a scale that captures geometry of principal sandbodies. Porosity and permeability estimated from charts were populated in the grid using comparable geostatistical techniques that reflect their spatial distribution. The resultant models were conditioned to facies property to honour available data. The results indicate a strong control of geometrical parameters on facies distribution, lateral continuity and connectivity with resultant effect on porosity and permeability distribution. Sand-prone FA1 and FA2 display reservoir quality that varies internally from channel axis to margin in each succession. Furthermore, isolated stack pattern of sandbodies reduces static connectivity and thus, increases risk of poor communication between reservoir-quality sandbodies. FA3 is non-reservoir because it is mud-prone. In conclusion, the risk of poor communication between sandbodies may be effectively accentuated in reservoirs that have similar architecture because of thick lateral accretion deposits, usually mudstone, that tend to disconnect good-quality point-bar sandbodies. In such reservoirs, mudstone may act as a barrier to impede flow vertically from one sandbody to another and laterally at the margins of each channel-fill succession in the system. The development plan, therefore, must be designed to effectively mitigate these risks and the risk of stratigraphic compartmentalization for maximum hydrocarbon recovery.

**Keywords :** analogues, architecture, connectivity, fluvial
**Conference Title :** ICGG 2025 : International Conference on Geology and Geophysics
**Conference Location :** Montreal, Canada
**Conference Dates :** May 24-25, 2025